

Fig 1

<u>Inst</u>	<u>Hit/Miss</u>	<u>Data</u>	
18 — LDR [R <sub>n</sub> ]	Hit	Data [R <sub>n</sub> ]	
MOV	N/A	—	
CMP	N/A	—	
⋮	⋮	⋮	
20 — LDR [R <sub>n</sub> ]	Miss	—	<div> <div></div> <div>variable delay</div> <div></div> </div>
MOV	N/A	—	
CMP	N/A	Data [R <sub>n</sub> ]	
⋮			
22 — LDR [R <sub>1</sub> ]	Miss	—	
24 — LDR [R <sub>2</sub> ]	Miss	—	
MOV	N/A	—	
CMP	N/A	28 — Data [R <sub>2</sub> ]	<div> <div>missed data returned out of order</div> </div>
ADD	N/A	26 — Data [R <sub>1</sub> ]	

Fig. 2

Instruction Trace Stream

...

30 — LDR [R1] -- miss  
 MOV  
 CMP

34 — LDR [R2] -- hit  
 LDR [R3] -- miss

38 — ADD  
 MOV  
 SUB

...

Data Trace Stream

...

32 — Data Place Holder Tag 1  
 —  
 —

36 — Data [R2]  
 Data Place Holder Tag 2

40 — —

42 — Late Data Tag 2 [R3]

44 — Late Data Tag 1 [R1]

...

Fig. 3

Instruction Trace Stream

...

46 — LDR [R1] -- miss  
 CMP  
 ADD

50 — LDR [R2] -- hit  
 LDR [R3] -- miss  
 SUB  
 MOV

56 — LDR [R4] -- miss  
 CMP  
 MOV

...

Data Trace Stream

...

48 — Data Place Holder Pending  
 —  
 —

52 — Data [R2]  
 Data Place Holder 1 pending

54 — Late Data [R1]  
 —

58 — Data Place Holder 1 pending  
 Late Data [R3]  
 Late Data [R4]

...

Fig. 4

# Instruction Trace Stream

62 (LDR [R1] --- miss)  
 (MOV)  
 SUB  
 SYNC {1 pending}  
 LDR [R2] --- miss  
 60 CMP  
 ADD  
 64 LDR [R3] --- hit  
 MOV  
 SUB  
 CMP  
 ...  
 ...

earliest trace info.

# Data Trace Stream

(Data Placeholder)  
 ---  
 ---  
 ---  
 66 Data Placeholder  
 68 ~~Late Data [R1]~~  
 ---  
 Data [R3]  
 Late Data [R2]  
 70 ---  
 ---  
 ...  
 ...

Fig. 5

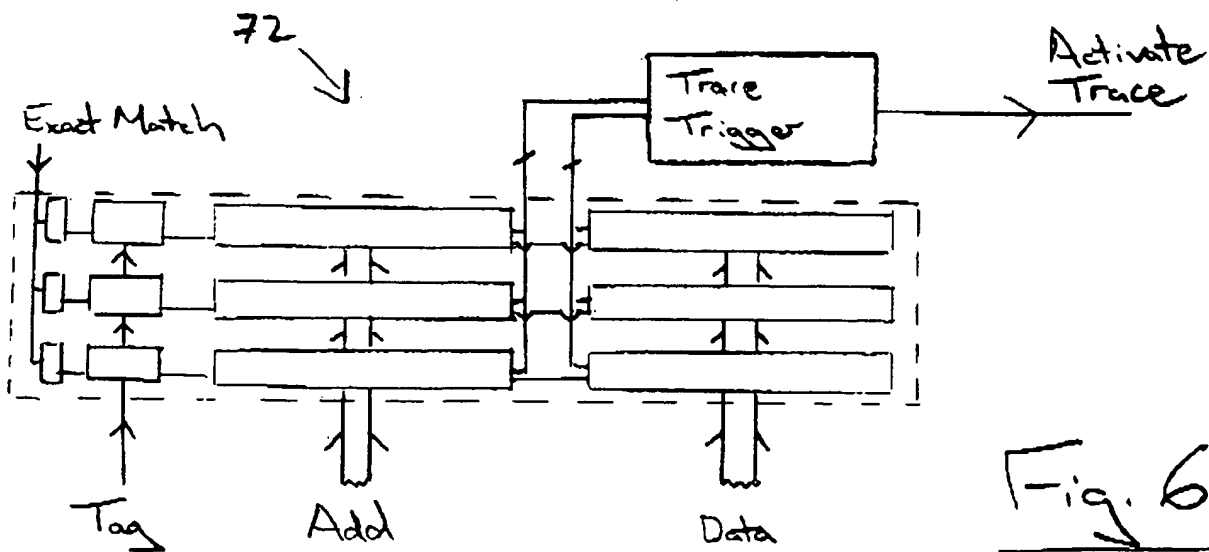


Fig. 6

Instruction  
Stream

Data  
Stream

② — LDR [R1] — miss  
74 — CMP  
MOV

76 — Data [R1] — ①

Fig. 7

Exact Match	Add Match	Data Match	Trace Activation Point
✓	✓	✓	①
✓	✓	X	none
X	✓	✓	②
X	✓	X	②

Fig. 8

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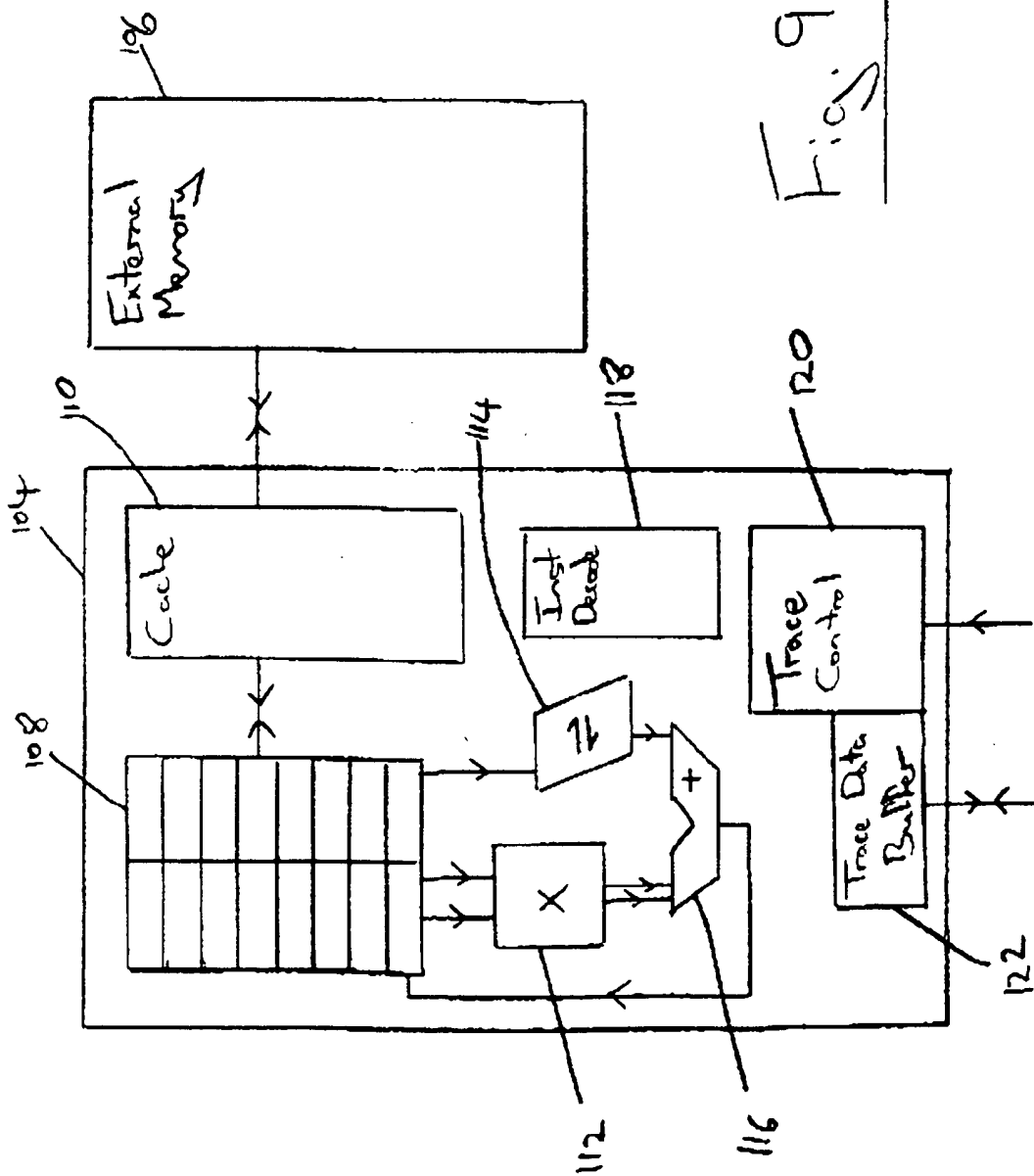


Fig. 9

LSM  $R_n[Add]$ ,  $RegList$

16 bits

0000100010001011



R0	
R1	
R3	R11
R7	

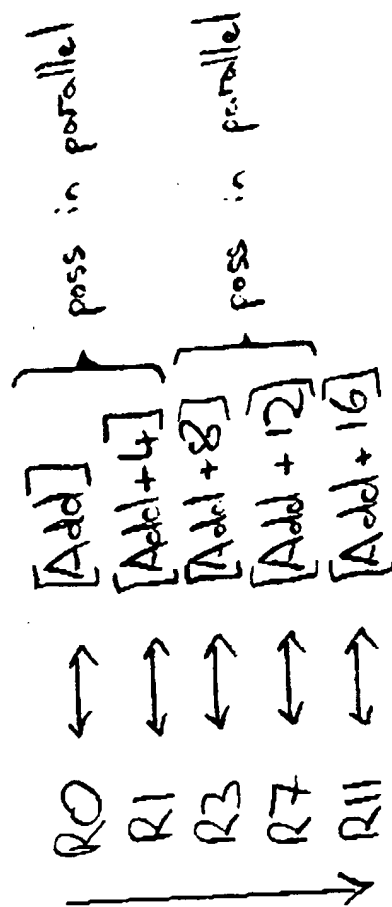


Fig. 10

R0  $\xleftrightarrow{DW_1}$  [Add]

R1  $\xleftrightarrow{DW_2}$  [Add+4]

R3<sup>#</sup>  $\xleftrightarrow{DW_3^*}$  [Add+8]<sup>!</sup>

R7  $\xleftrightarrow{DW_4}$  [Add+12]

R11  $\xleftrightarrow{DW_5}$  [Add+16]

Trace  
Trigger

Trace  
to  
End



Trace Data Stream

..... {LSM}, {DW<sub>3</sub>}, {Add+8}, {Place Holder}, {Place Holder},

← Count back to R3

Fig. 11



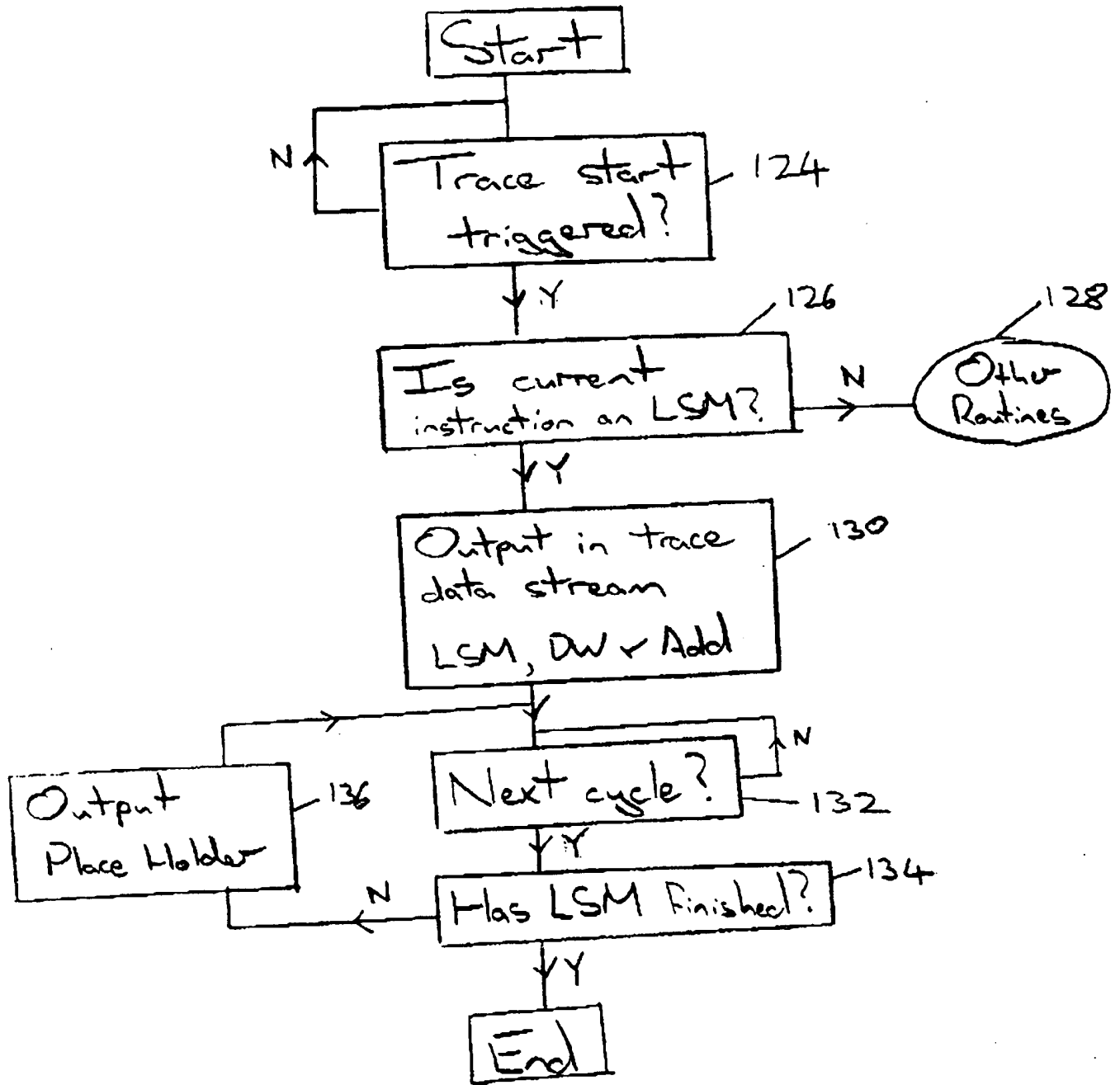


Fig. 12

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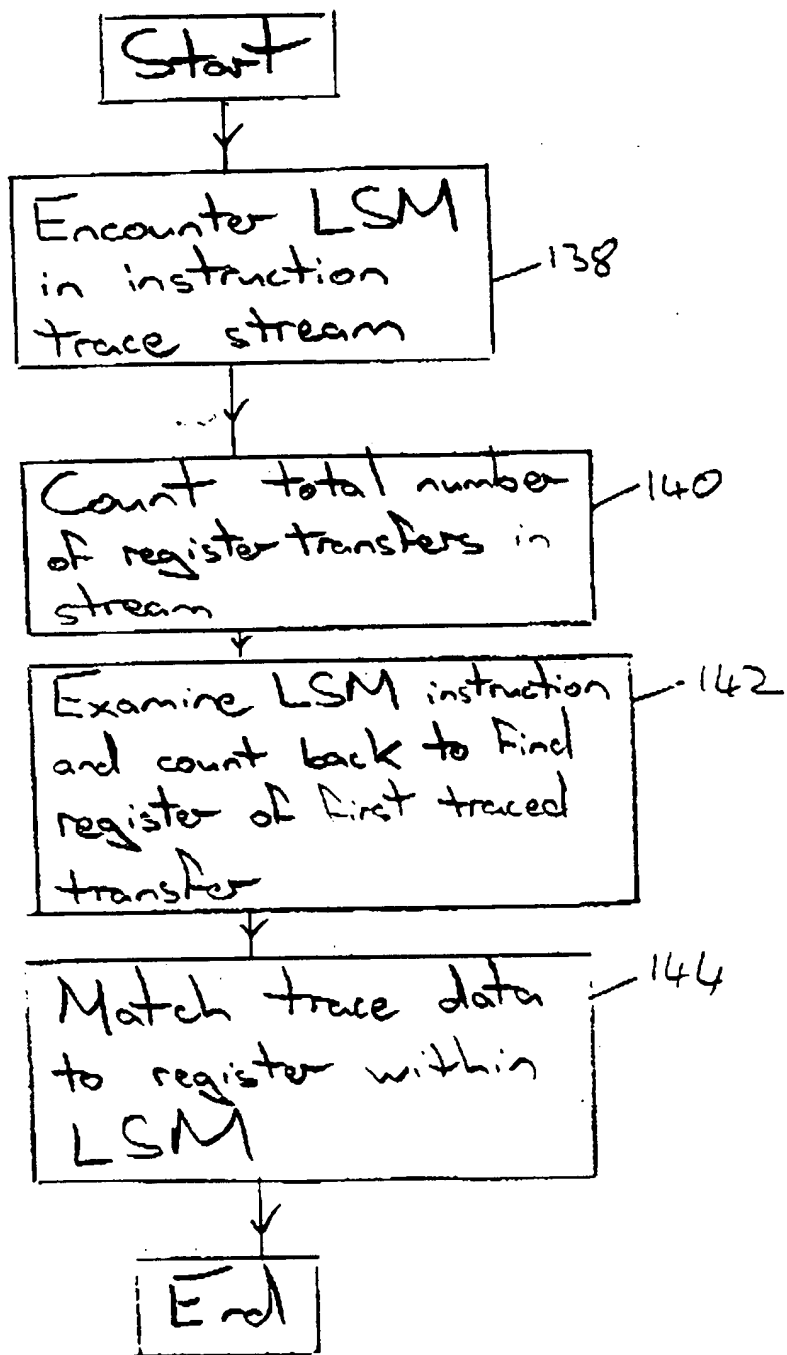


Fig. 13